

ORIGINAL

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of)	
)	
Satellite Delivery of Network Signals)	CS Docket No. 98-201
To Unserved Households for)	RM No. 9335
Purposes of the Satellite Home)	RM No. 9345
Viewer Act)	
)	
Part 73 Definition and Measurement)	
of Signals of Grade B Intensity)	

COMMENTS OF NORTHPOINT TECHNOLOGY

Northpoint Technology ("Northpoint"), by its attorneys, hereby submits its comments on the *Notice of Proposed Rulemaking* ("Notice") in the above-captioned proceeding. In the *Notice*, the Commission described the controversy at the heart of the Primetime 24 lawsuits¹ and sought comment on how best to define "unserved" households eligible to receive satellite transmission of broadcast signals under the Satellite Home Viewer Act. The *Notice* implicitly recognized that the Primetime 24 situation arose because direct-to-home satellite providers currently do not offer local

¹ In these lawsuits, several broadcast stations initiated an action against Primetime 24 for copyright infringement. The complaint alleged that Primetime 24 had violated the Satellite Home Viewer Act by retransmitting distant network programming to satellite dish owners who were not "unserved households" under the Act. *See CBS, Inc. et al. v. PrimeTime 24 Joint Venture*, 9 F.Supp.2d 1333 (S.D. FL., May 13, 1998). ABC filed a similar lawsuit against PrimeTime 24 in North Carolina. *ABC, Inc. v. Primetime 24 Joint Venture*, 1998 WL 544286 (M.D. N.C., July 16, 1998). In the former case, a preliminary injunction was issued against Primetime 24, in the latter

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broadcast signals to subscribers. As such, the Commission also sought comment on the prospects that the industry will develop "local-into-local" technology to serve every community.

However, as discussed herein, a solution to the local-into-local problem currently exists. Northpoint has developed and tested a technology that could enable DBS subscribers and others to receive all local broadcast signals – and that could be deployed within a matter of months. Essentially this technology would permit the re-use of the 12.2-12.7 GHz band terrestrially in order to deliver local television signals and even broadband digital data to American consumers in a timely manner and at an economical price. Northpoint believes its technology can not only solve permanently the local signal problem but also provide a solution in the short term for certain Primetime 24 customers who might otherwise lose their broadcast service.

I. CONSUMERS WANT LOCAL-INTO-LOCAL PROGRAMMING IN THE 12.2-12.7 GHz BAND

To date, American consumers have collectively spent approximately \$4 billion on reception equipment and antenna installation to receive video programming signals in the 12.2-12.7 GHz band. Yet, such programming does not include the local broadcast television signals – including the local news, weather and advertising – of the subscriber's own community. Because of the satellite transmission of DBS transmissions, programming available in this band is inevitably national in nature.

(. . . continued)
the court issued a permanent injunction.

However, as the Commission has long recognized, the public clearly benefits from the availability of local programming. Consumers themselves have repeatedly indicated their significant interest in also being able to receive their local broadcast signals within these frequencies using their existing equipment.²

The Primetime 24 lawsuits arose because an entity attempted to address this loud consumer clamoring for the delivery of local broadcast signals in the 12.2-12.7 GHz band. Yet, Primetime 24 is clearly not the solution to the local-into-local problem. Primetime 24 – or for that matter any satellite technology – is inherently unable to deliver to each subscriber all of their local broadcast signals. Because of the national coverage of the satellite signal and the limited amount of spectrum for different programming, a satellite-based system simply could not transmit all local broadcast stations in every community.³

Yet, because of the significant investment that consumers have made in equipment in the 12.2-12.7 GHz, the public interest would clearly be served by an effective and comprehensive solution to the local-into-local problem that would utilize their existing equipment. As detailed below, Northpoint has developed such a

² Some Americans are unable to receive all their local television signals through other means; others simply want a method of receiving them that is more conveniently integrated with their DBS programming.

³ In order to offer all 1500 local broadcast channels would require over 9000 MHz of total bandwidth – more than the bandwidth of all of the orbital slots combined. Carriage of high definition signals will require more bandwidth that cannot be obviated by compression techniques.

technology. Significantly, Northpoint's solution obviates the need for any revision to the grade B contour requirements or signal strength measurements.

II. NORTHPOINT'S TECHNOLOGY CAN DELIVER LOCAL-INTO-LOCAL CAPABILITY PROMPTLY AND INEXPENSIVELY

Northpoint has developed an innovative solution that can quickly and simply enable current DBS subscribers and others to receive all local broadcast signals in a high quality digital format using the exact same consumer equipment currently in the consumer's home. Northpoint's technology is an advanced digital wireless system that would allow DBS and terrestrial broadcasters to co-exist within the 12.2-12.7 GHz band – doubling the available capacity of the spectrum and enabling the provision of local television channels and high-speed terrestrial-based wireless Internet service to consumers. Tests conducted under a FCC experimental license in October 1997 and just recently in December 1998 clearly demonstrate how Northpoint's technology can provide local television signals without interference to existing services.⁴ A potential allocation for deployment of Northpoint's technology is currently the subject of a separate *Notice of Proposed Rulemaking*.⁵

⁴ Northpoint conducted its first test in a rural area in Texas in October, 1997. Northpoint's second test, in an urban environment in Austin, Texas, commenced earlier this month and is on-going. The results of both tests thus far fully support that Northpoint's technology can be deployed without interference to the reception of DBS transmissions. See Diversified Communications Engineering, Inc., *Progress Report*, Call Sign WA2XMY (filed Jan. 1998).

⁵ See *Amendment of the Commission's Rules To Authorize Subsidiary Terrestrial Use of the 12.2-12.7 GHz Band By Direct Broadcast Satellite Licensees and Their*
(Continued. . .)

Northpoint's patented and patent-pending technology was developed in an effort to solve the DBS "local signal" problem. Northpoint recognized that existing consumer DBS antennas are able to discriminate between signals emanating from different satellite orbital "slots" over the equator separated by only 9 degrees.⁶ Northpoint was able to develop technology that, in effect, creates a terrestrial orbital slot whereby DBS spectrum can be re-used in different local markets without harmful interference to existing DBS services. This basic technology can not only be used to provide local television signals, but also be employed to deliver high-speed Internet services within the DBS band and terrestrial digital services in any spectrum allocated for geosynchronous satellite systems.

Conceptually, Northpoint's technology utilizes the general southerly orientation of domestic DBS dishes to avoid interference with conventional DBS services. By using directional terrestrial transmitters pointed south, Northpoint's signals arrive at the "back" of standard consumer DBS dishes. As a result, the signals are not received or

(. . . continued)

Affiliates, Notice of Proposed Rulemaking, FCC 98-310 (rel. Nov. 24, 1998). Northpoint had previously filed a Petition for Rulemaking last spring that sought modification of the Commission's Rules to permit deployment of this service. See Northpoint Technology, *Petition for Rulemaking to Modify Section 101.147(p) of the Commission's Rules to Authorize Subsidiary Terrestrial Use of the 12.2-12.7 GHz Band by Digital Broadcast Satellite Licensees and Their Affiliates*, RM-9245 (filed March 6, 1998). A copy of Northpoint's petition as well as its reply comments in that proceeding are attached.

⁶ These existing DBS systems are able to co-exist without mutually harmful interference because end-user DBS satellite receivers are directional and can be oriented to a signal emanating from a specific orbital slot while suppressing signals from other orbital slots. In some cases (*e.g.*, coastal users), the inability to "see" some orbital slots also aids in mitigating harmful interference.

noticed by the subscriber as interference to the existing DBS video programming, but rather are received as a wholly different interference-free transmission. The FCC has proposed to use this type of sharing system among other technologies and refers to it as "geo-stationary arc avoidance."

Because the Northpoint signal comes into the "back" of the DBS subscriber dish, the Northpoint signal will not interfere with the reception of existing DBS programming. Northpoint's real world experimental trials in both rural and urban environments have demonstrated that, even in near-worst case atmospheric conditions, at least 99.5 percent of the transmitter's service area is outside the "mitigation zone."⁷ Thus, using sound engineering practices, Northpoint's technology can be deployed effectively, efficiently, and without causing harmful interference to existing or future DBS subscribers or other current users of the band.⁸

Further, if authorized by the Commission, Northpoint can implement its technological solution to the local-into-local problem very economically and in a matter

⁷ See Reply of Northpoint Technology, RM-9245 (filed May 5, 1998); Diversified Communications Engineering, Inc., *Progress Report*, Call Sign WA2XMY (filed Jan. 1998). Because Northpoint contemplates an average service area for each transmitter of 105 square miles, the mitigation zone would typically be less than 0.5 square miles. In many cases, the height of the transmitter would cause most of this area to be located in the air or confined to the immediate property on which the antenna is located.

⁸ Although several DBS providers had previously raised certain concerns about potential interference to their systems caused by Northpoint's technology, Northpoint fully and completely addressed these concerns in its reply comments. See Reply of Northpoint Technology, RM-9245 (filed May 5, 1998). In addition, several of these commenting parties are currently participating in Northpoint's current demonstration in Austin, Texas.

of months. Because Northpoint's technology operates in the same band, and uses the same transmission and reception equipment as conventional DBS, the components for Northpoint's system are for the most part "off the shelf" and in mass production. Not only does this eliminate any delays associated with the development and production of brand new equipment, but also results in relatively low costs for the components. Indeed, the transmit antennas Northpoint contemplates using are tiny – 10 inches in height – and cost only \$3,000 each (in contrast, a VHF television antenna is 300 feet long and costs over \$1,000,000). Thus, for a market such as Dallas-Fort-Worth, Texas, Northpoint estimates that it would cost approximately \$6.5 million to construct a local signal distribution system that would carry all the local television channels in both DBS formats. Northpoint believes it can have such a system up and running in a city in less than one year, providing a rapid solution to the local-into-local problem.

Rapid deployment of this technology would promote clearly localism and address community needs by increasing the availability of local programming. As the Commission recognized in the *Notice*, under Section 335(a) it has a statutory duty to "examine the opportunities that the establishment of direct broadcast satellite service provides for the principle of localism under this Act, and the methods by which such principle may be served through technological and other developments."⁹ Northpoint can aid the Commission in fulfillment of that duty. Northpoint's technology can provide DBS subscribers and others with access to all local broadcast stations in every

⁹ 47 U.S.C. § 335(a).

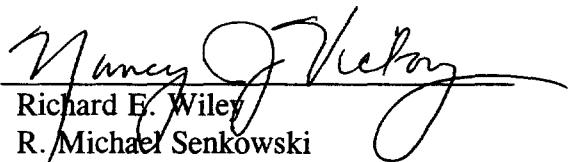
market in a timely manner and at a reasonable price. Indeed, because of the rapidity with which Northpoint's technology can be deployed to serve a given market, this technology could serve as a solution in the near term for Primetime 24 customers facing termination by quickly and inexpensively providing another means for them to access local signals.

III. CONCLUSION

For the foregoing reasons, the Commission cannot and should not rely on the DBS industry to develop a local-into-local technology. Not only would a satellite solution require more capacity than is available in this band, but a terrestrial solution already exists. Unlike the very limited broadcast programming offered by DBS providers, Northpoint's system can immediately solve the local-into-local problem by providing technically feasible and interference-free delivery of all local television stations in every market. Significantly, such a system can also be implemented quickly and at a very reasonable cost.

Respectfully submitted,

NORTHPOINT TECHNOLOGY

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December 11, 1998

DUPLICATE

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of:

NORTHPOINT TECHNOLOGY

Petition for Rule Making To Modify Section
101.147(p) of the Commission's Rules To
Authorize Subsidiary Terrestrial Use of the
12.2-12.7 GHz Band By Digital Broadcast
Satellite Licensees and Their Affiliates

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) RM No. _____
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To: The Commission

PETITION FOR RULE MAKING

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March 6, 1998

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NORTHPOINT TECHNOLOGY)	RM No. _____
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Petition for Rule Making To Modify Section)	
101.147(p) of the Commission's Rules To)	
Authorize Subsidiary Terrestrial Use of the)	
12.2-12.7 GHz Band By Digital Broadcast)	
Satellite Licensees and Their Affiliates)	
To: The Commission		

PETITION FOR RULE MAKING

Northpoint Technology ("Northpoint"), by its attorneys, hereby petitions the Federal Communications Commission to initiate a rule making to modify Section 101.147(p) of its rules to allow Direct Broadcast Satellite ("DBS") licensees and their affiliates to obtain secondary, subsidiary communications authorizations for terrestrial use of the 12.2-12.7 GHz band. As discussed herein, Northpoint has developed an innovative plan that would jumpstart competition in the multichannel video program distribution marketplace by allowing terrestrial DBS affiliates to re-use the DBS band in order to distribute local television signals and deliver broadband digital data to American consumers. Northpoint's unique approach to terrestrial use of the band will enable a broad range of new services by efficiently "re-harvesting" existing spectrum resources without any harmful interference to existing services. Accordingly, Northpoint urges the FCC promptly to initiate a rule making bringing the benefits of this technology to the American public.

I. SUMMARY

In its recent report to Congress on the multichannel video program distribution market, the Commission bemoaned the current state of competition. Noting cable television's overwhelmingly dominant position in the market despite rapidly rising rates and widespread customer dissatisfaction, the Commission's report identified DBS services as the most significant alternative to cable. Yet, the report also recognized that the current inability of DBS to carry local broadcast signals is the single most important impediment to DBS' ability to compete effectively with cable for customers.

Northpoint has developed an exciting, innovative solution that can quickly and simply remove this impediment to competition in the multichannel video program distribution marketplace. Northpoint's technology is an advanced digital wireless system that would allow DBS and terrestrial broadcasters to co-exist within the 12.2-12.7 GHz band – doubling the available capacity of the DBS spectrum and enabling DBS services, such as DirecTV, to provide local television channels and high-speed terrestrial-based wireless Internet service. Tests conducted under a FCC experimental license in October 1997 demonstrate how Northpoint's technology can provide local television signals without interference to existing services.

By enabling the carriage of all full power and qualified low power television stations, Northpoint's technology would finally level the playing field for DBS to compete against cable operators, with resulting lower rates and increased program variety for consumers nationwide. The system's effect of increasing consumers' ability to access local programming would also promote localism and address community needs. Additionally, by expanding the capacity of DBS systems, Northpoint's proposal would finally enable DBS providers to meet certain

Congressionally-mandated, noncommercial programming requirements. The technology would also permit the offering of a wide range of broadband data services and provide a model for spectrum sharing in other frequency bands.

Significantly, only minimal rule changes are required to bring the benefits of Northpoint's technology to the public. As described herein, simple modifications to an existing provision of Part 101 of the Commission's Rules would permit DBS licensees, and third party systems integrators affiliated with DBS systems, to obtain secondary, shared authorizations to deploy terrestrial facilities for the provision of a complete menu of local television programming and other adjunct data services in the 12.2-12.7 GHz band. Northpoint urges the FCC to act expeditiously to allow deployment of this technology in order to spur competition in the multichannel video program distribution market and bring the vast benefits of DBS/terrestrial sharing to the American public.

II. OVERVIEW OF THE NORTHPOINT SYSTEM

At present, 8 million Americans subscribe to Digital Broadcast Satellite ("DBS") services to receive multichannel video programming. DBS utilizes a digital satellite signal that can be received by a small consumer dish antenna, decoded by a receiver, and converted into multiple channels of high quality video programming. Because the system is digital, picture quality is typically very good, sound is of compact disk quality, and compression techniques can be used to provide a wide selection of programming. Due to the multiplicity of local over-the-air television stations within the vast areas served by DBS satellites, however, DBS systems do not have the bandwidth capacity to carry all local TV signals in all local markets. For this reason, and despite

the fact that DBS subscription rates are quite reasonable. DBS has not been able to compete fully with cable television systems.

Northpoint's patented and patent-pending technology was developed in an effort to solve the DBS "local signal" problem. Northpoint recognized that existing consumer DBS antennas are able to discriminate between signals emanating from different satellite orbital "slots" over the equator separated by only 9 degrees.¹ Northpoint was able to develop technology that, in effect, creates a terrestrial orbital slot whereby DBS spectrum can be re-used in different local markets without harmful interference to existing DBS services. This basic technology can not only be used to provide local television signals, but also be employed to deliver high-speed Internet services within the DBS band and terrestrial digital services in any spectrum allocated for geosynchronous satellite systems.

Conceptually, Northpoint's technology utilizes the generally southerly orientation of domestic DBS dishes to avoid interference with conventional DBS services. By using directional terrestrial transmitters pointed south, Northpoint's signals arrive at the "back" of standard consumer DBS dishes and are not received or noticed by the subscriber as interference to the existing DBS video programming. With the addition of a second dish pointed north, however, the subscriber would be able to receive the wholly different Northpoint transmission. Because Northpoint's technology operates in the same band, and uses the same digital encoding, as conventional DBS, the second Northpoint end-user antenna can be connected to the existing

¹ These existing DBS systems are able to co-exist without mutually harmful interference because end-user DBS satellite receivers are directional and can be oriented to a signal emanating from a specific orbital slot while suppressing signals from other orbital slots. In some cases (e.g., coastal users), the inability to "see" some orbital slots also aids in mitigating harmful interference.

DBS receiver and the local programming can be decoded. Thus, Northpoint's technology is the *only* system for local television signal distribution that can provide access to *all* qualified local stations in every market while preserving DBS subscribers' existing equipment investment.

Northpoint envisions its technology being deployed cooperatively by DBS providers, systems integrators, and local broadcasters with licensees being granted secondary, subsidiary shared authorizations subject to specific non-interference conditions. As a condition of licensing, the system integrator licensee would also be subject to "must carry" rules and retransmission consent requirements for carriage of local television broadcast signals. Notably, even carrying the full complement of locally-available television signals in *both* currently used DBS digital formats, Northpoint's system still would have significant excess capacity that could be used to deliver a range of broadband data offerings.

III. NORTHPOINT'S TECHNOLOGY WILL FURTHER CRITICAL PUBLIC INTEREST POLICIES

FCC action to permit the deployment of Northpoint's technology would clearly serve the public interest by furthering important FCC and Congressional goals. Most significantly, Northpoint's technology would remove a major barrier to full and fair competition in the multichannel video program distribution marketplace, with resulting benefits to consumers in terms of lower rates and greater program variety. Deployment of this technology would also promote localism and address community needs by increasing the availability of local programming. Northpoint's proposal additionally would expand the capacity of DBS systems to enable DBS providers to meet Congressionally-required, noncommercial programming

requirements. Finally, this technology would provide additional opportunities for spectrum efficiency and support critical data transmission needs.

A. Northpoint's Technology Will Enable DBS Providers To Compete More Effectively Against Cable Television Systems

In its recently released annual report to Congress, the FCC evaluated the state of competition in the multichannel video program distribution ("MVPD") market. The report noted that "the cable industry continues to occupy the dominant position in the MVPD marketplace," with "87% of MVPD subscribers receiv[ing] service from their local franchised cable operator."² Based upon these statistics, the FCC concluded that "[l]ocal markets for the delivery of video programming generally remain highly concentrated and are still characterized by some barriers to both entry and expansion by competing distributors."³ Notwithstanding that only 45 percent of cable television subscribers report being satisfied with their service, "a Commission survey of cable industry prices indicates that the average monthly rate for programming services offered on basic and cable programming service . . . tiers and equipment charges increased from \$26.57 on July 1, 1996, to \$28.83 on July 1, 1997, an increase of 8.5%."⁴ Due to the seemingly unchecked rise in cable rates, the report also notes that the "Consumers Union and Consumers Federation of

² *Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, CS Dkt. No. 97-141, Fourth Annual Report (1997 Report) (1998) at ¶ 87.

³ *Id.* at 6.

⁴ *Id.* at 7. See also *id.* at ¶ 87 (noting that, "[a]ccording to a Nielsen Media Research survey, on a scale of one to five (with five being the most satisfied), 80% of DBS subscribers rate overall satisfaction with their satellite service as a four or a five. By comparison, 45% of cable subscribers rate overall satisfaction with their cable service as a four or a five."); "Paying the

(Continued...)

America filed a petition asking the Commission to freeze current rates for all regulated cable services while it investigates why rates are increasing so rapidly and considers changes to its cable rate regulation formula.”⁵

The Commission’s report also evaluated the role of DBS in the MVPD market, noting that “DBS service is widely available and constitutes the most significant alternative to cable television.” The report found, however, that “[i]mpediments to carriage of local broadcast signals by DBS services reduce the satellite services’ ability to compete effectively with cable television.”⁶ The Commission noted that one of consumers’ major concerns about the purchase and use of a DBS system was the inability to receive local channels, citing a consumer survey that reported, of those consumers that had recently shopped for a digital satellite system, “87% of those surveyed cited the inability to receive local stations as major reason for not buying a DBS system.”⁷ The universe of potential DBS subscribers thus appears limited to: (i) those in rural areas without any local broadcasts to receive; (ii) those with the ability to receive good signal quality over-the-air broadcasts from the full range of desired local stations and with the technical capability to integrate DBS and over-the-air signals into their televisions; (iii) those able to afford *both* cable and DBS; and, (iv) those willing to forego the benefits of local

(...Continued)

Price for Cable TV,” *The Washington Post*, February 21, 1998, pp. H1, H2 (“cable prices are bounding upward at triple the general inflation rate”).

⁵ *Id.*

⁶ Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, CS Dkt. No. 97-141, Fourth Annual Report (1997 Report) (1998) at ¶ 57.

⁷ *Id.* at ¶ 57.

broadcasting. Comparatively speaking, Northpoint believes, DBS is currently competing for only a small percentage of the overall video delivery market.

The competitive consequences of the lack of local signal delivery has immediate and substantial financial ramifications for the American public. Indeed, if its technology were deployed immediately to make DBS fully competitive with cable, Northpoint believes American consumers would save over \$3 billion dollars annually. As an initial matter, assuming that 60 percent of DBS subscribers use basic cable services to obtain local signals at an average price of \$28.83 per month⁸ and that these consumers could obtain local signals through Northpoint's technology at an average of \$7 per month,⁹ current potential savings from Northpoint's system would amount to \$1.26 billion annually for existing DBS subscribers. Even more important, however, is the effect of this technology in enabling a real competitor to cable television. In order to compete with DBS, cable operators will undoubtedly reduce prices for all consumers. Simply rolling back last year's 8.5 percent average cable price hike would result in a \$1.74 billion dollar dividend for the 64.2 million American families who use cable services.¹⁰

⁸ Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, CS Dkt. No. 97-141, Fourth Annual Report (1997 Report) (1998) at 7.

⁹ Northpoint believes that \$7 per month for local television signals using its technology is a high estimate. Under some economic scenarios, Northpoint believes it may financially viable to offer such services for less than half that cost.

¹⁰ Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, CS Dkt. No. 97-141, Fourth Annual Report (1997 Report) (1998) at 6-7.

B. Northpoint's Technology Will Add Value to DBS And Promote Localism By Curing the Local Television Signal Problem

The DBS system was designed and implemented using geosynchronous satellites to cover all, or vast portions of, the continental United States. Thus, the DBS satellite "feed" received by a Washington, D.C. DBS customer is identical to the feed received by a subscriber in Chicago, Illinois. Without the capability to vary the content of the DBS channels on a city-by-city basis, DBS simply cannot provide every local subscriber with access to that subscriber's locally available over-the-air programming. To do so would require DBS providers to carry every one of the over 1500 high power television stations and certain qualifying stations among the 2033 low power television stations in the United States. With each DBS provider having access to 500 channels or less, and given the competitive need to carry a substantial number of non-broadcast programming (*e.g.*, premium movie channels, MTV), DBS providers have had to resort to carrying only a few of the many affiliates of each of the major networks.

The value of locally-originated programming responsive to community needs cannot be understated. Local programming originating from Seattle—or even New York City—does not enable communities outside of those cities to access local news, weather and other information pertinent to their local needs and interests. Similarly, as the FCC has recognized in the past, locally-originated programming strengthens communities by connecting individuals with cultural events, local politics, and other community-oriented "hot" topics. The rich diversity of commercial and non-commercial stations in the United States, in fact, attests to the value of localism. For example, in cities with a high non-English speaking population, local television stations may broadcast in a foreign language all or part of the time, serving a critical role by fulfilling cultural needs, providing information to engage citizens in the community who might

otherwise be unaware of vital health, safety, political or other issues, and providing needed entertainment, and targeted advertising, to valuable subsets of the population.

C. Northpoint's Technology Will Provide DBS Providers a Method to Deliver Noncommercial Broadcasting Services

With the passage of the 1992 Cable Act, Congress added a new Section 335 to the Communications Act which directed the Commission to initiate a rule making to impose public interest or other requirements for providing video programming on DBS service providers.¹¹ Section 335(a) states, among other things, that any regulations shall, at a minimum, apply the political broadcasting rules of the Communications Act to DBS providers, including the access to broadcast time requirement of Section 312(a)(7) and the use of facilities requirements of Section 315. This section also requires the Commission to examine the opportunities that the establishment of DBS service provides for the principle of localism and permits the Commission to impose additional public interest obligations on DBS providers if they are warranted. Section 335(b) mandates that DBS providers reserve between 4 percent and 7 percent of their channel capacity exclusively for noncommercial programming of an educational or informational nature.

The Commission launched a proceeding in 1993 on this issue,¹² and recently has issued a public notice seeking to update and refresh the record in this proceeding.¹³ The main stumbling

¹¹ Section 335 was added to the Communications Act by Section 25 of the 1992 Cable Act. U.S.C. § 335.

¹² *Implementation of Section 25 of the Cable Television Consumer Protection and Competition Act of 1992, Direct Broadcast Satellite Service Obligations*, MM Dkt. No. 93-25, Notice of Proposed Rulemaking (*Public Service Obligations NPRM*), 8 FCC Rcd 1589 (1993).

¹³ *Implementation of Section 25 of the Cable Television Consumer Protection and Competition*
(Continued...)

block to implementation of this Congressional mandate has been the lack of available channel space for DBS providers to provide such localized, public-oriented broadcasting. Northpoint's technology will provide an extraordinary source of new capacity for DBS providers, enabling them to meet these Congressionally-required, publicly beneficial, noncommercial programming requirements.

D. Northpoint's Technology Will Enable A Wide Range of Needed New Broadband Data Capabilities

As the Commission's *1997 Report* indicates, cable television systems are increasingly offering consumers the ability to obtain Internet and other broadband data services using the cable television plant. Obviously, any competitor, including DBS, will have to offer similar capabilities to remain a viable market player. Internet services, like local broadcast signals, are inherently localized in nature. Indeed, it would be highly inefficient to use broadband capacity available on a satellite system covering the United States to broadcast data intended only for a single subscriber.

Northpoint's technology, however, is ideally suited for the delivery of high-speed Internet services, broadband data offerings, and other innovative services completely distinct from typical DBS or satellite services. In addition to offering local television signals, Northpoint's technology can provide communities with offerings utilizing bulk downloads of data and ultra high-speed, local wireless Internet services. Not only will this offer communities a gateway to

(...Continued)

Act of 1992, Direct Broadcast Satellite Service Obligations Comments Sought in DBS Public Interest Rulemaking, MM Dkt. No. 93-25, Public Notice, 12 FCC Rcd 2251 (1997).

the vast resources of the Internet, Northpoint's special transmission characteristics will allow new community-based services that are not possible with low speed wireline Internet service. For example, schools will be able to offer interactive distance learning, parents and caregivers will be able to monitor children and other loved ones in day care or hospitals. While important to all communities, this benefit is particularly valuable in rural areas.¹⁴

Northpoint's ability to provide high-speed data services is attributable to the very broadband nature of the system and the city-by-city frequency reuse. The technology is easily capable of burst transmission rates of 1.5 megabits per second or more. In conjunction with a more conventional wireline telephone or wireless return channel – or even using the technology in a two-way configuration – the system is uniquely suited for asymmetric data applications like the Internet, where far more data is sent to the user than data sent from the user. Thus, using Northpoint's system, DBS operators will, like their cable competitors, be capable of offering adjunct broadband data services in conjunction with conventional video programming.

Ultimately, the ramifications of Northpoint's technology will extend far beyond the immediate commercial application in the DBS spectrum. Because the system is a generic means for sharing between terrestrial fixed services and geostationary orbit satellites, this technology will open the door to reharvesting vast blocks of spectrum for national security, public safety, educational, medical, and other uses. Using the technology, new broadband networks can be deployed in bands previously restricted to geostationary satellite space-to-earth links. And,

¹⁴ Notably, because larger exclusion zones can be engineered in rural areas, which provides a correspondingly greater reliable service area, Northpoint's system can economically serve vast rural markets on a cost-effective basis. In other words, Northpoint Technology does not suffer the cost penalties associated with many new radio services in rural areas where the cost of infrastructure cannot be justified in low population density areas.

conversely, if Northpoint technology is used in terrestrial allocations, geostationary satellite use can be enabled in previously terrestrial-only bands. In fact, Northpoint additionally makes possible a new paradigm of services: team broadcasting from both terrestrial and satellite sources. For example, this technology could be utilized to provide Enhanced Radio Broadcasting, where listeners will be able to customize their listening experience by accessing deeper layers of programming at the touch of a button. In this way a listener could hear the second track of a music CD, or go to the full text of a speech, even after the announcer had moved on to another selection or news story.

IV. NORTHPOINT'S EXPERIMENTAL TRIALS DEMONSTRATE THE FEASIBILITY OF NON-INTERFERING TERRESTRIAL USE OF THE 12.2 - 12.7 GHz BAND

As indicated above, Northpoint envisions a terrestrially-originated supplement to DBS that relies on the relatively uniform orientation of existing DBS receivers. Conceptually, Northpoint uses a directional antenna radiating southerly (*i.e.*, into the back of the DBS subscriber dish) to communicate with a supplemental, directional antenna (oriented generally northerly) that connects with the existing DBS receiver unit. Because the Northpoint signal comes into the "back" of the DBS subscriber dish, a region where spurious signal rejection is very good, the Northpoint signal will not interfere with the reception of existing DBS programming. As discussed further below, Northpoint's real world experimental trials demonstrated that, even in near-worst case atmospheric conditions, the "exclusion area" surrounding a terrestrial transmitter is very small (1/4 mi.) compared to the "reliable service area" served by the transmitter. Thus, using sound engineering practices, Northpoint's

technology can be deployed effectively, efficiently, and without causing harmful interference to existing or future DBS subscribers or other current users of the band.

A. Deployment of Northpoint's Technology Will Not Cause Harmful Interference to Existing or Future DBS Operations

The primary goal of Northpoint's experimental authorization was to verify that terrestrial transmitters could be deployed using directional antennas, in conjunction with known satellite positions, to provide terrestrial signals to the DBS receivers. It also sought to determine whether careful engineering could decrease the previously determined Carrier-to-Noise plus Interference ($C/(N+I)$) ratio needed to protect DBS operations from interference. This $C/(N+I)$ ratio was developed by DirecTV and detailed in a report submitted to the FCC.¹⁵ The DirecTV report analyzed the impact of *indiscriminately positioned* (with respect to DBS users), relatively high power, two-way terrestrial microwave links in the DBS band. Northpoint sought to supplement this record with precisely engineered positioning of its terrestrial transmitters to determine its effect on $C/(N+I)$ ratios. Once the appropriate $C/(N+I)$ ratio could be established, a known exclusion zone with a corresponding reliable service area for a particular transmit EIRP and direction could be defined.

The exclusion zone is an area where signals from the Northpoint terrestrial transmitter would cause harmful interference to DBS reception. The reliable service area of the Northpoint terrestrial transmitter is defined as an area where signals from the terrestrial transmitter will be sufficiently strong to be received without interference. Northpoint's system relies upon the use

¹⁵ On April 11, 1994, DirecTV submitted a report to the FCC entitled "Terrestrial Interference in the DBS Downlink Band".

of the known look angle and orientation of DBS receivers in an area to create, in effect, a land-based satellite orbital slot. By using directional antennas and orienting the transmitters in a southerly direction, Northpoint technology was developed to minimize the exclusion area for a given reliable service area.

Northpoint's complete experiment results were reported to the Commission on January 8, 1998. These results, as documented in this report, indicate that the basic concept of the Northpoint technology, transmitting terrestrially on co-channel satellite frequencies, is viable as long as the terrestrial station is properly engineered. This first stage of testing demonstrated that, as long as a $C/(N+I)$ ratio of at least 4.8 dB was maintained between the satellite signal and the terrestrial signal (with the terrestrial signal being the weaker signal), there would be no perceptible interference into the DirecTV or EchoStar DBS systems. This ratio is substantially lower than the 10 dB ratio demonstrated by the DirecTV report. Moreover, however this ratio is achieved, whether by antenna receive characteristics, power level adjustment, transmit antenna directionality, or a combination of all of these, the end result is the same—harmonious co-existence of co-channel terrestrial and satellite signals.

Importantly, Northpoint Technology can co-exist with DBS systems independent of atmospheric conditions. Typically, DBS systems incorporate a significant rain fade margin to ensure that, as weather conditions change and propagation losses increase, a usable received signal level is still maintained at the end-user dish. Thus, while a DBS signal on a clear day may be significantly higher than needed to achieve reliable communications, the margin may decrease substantially if rain conditions affect the Earth-to-space uplink or the space-to-Earth downlink.

However, by monitoring the received signal level of the DBS transmission on earth,¹⁶ Northpoint can adjust its transmitter output power in real time to ensure that a constant $C/(N+I)$ ratio is maintained for the DBS system. Thus, if there is 3 dB of fade affecting the DBS link in a given area, Northpoint can decrease the power of its transmission by 3 dB to avoid harmful interference.

With the $C/(N+I)$ ratio established, the experimental report details the determination that, in a rural environment with no multipath issues, a service area in excess of 10 miles (16 km) could be achieved while maintaining a minimal exclusion zone of less than $\frac{1}{4}$ mile (1320 ft/402 m). Notably, due to the limited transmit antenna height (52') used in the testing, the reliable service area was measured at 10 miles despite approximately 19 dB of ground attenuation. In areas where higher antenna elevations can be used, the reliable service area could be much larger. Additionally, since the exclusion zone is relatively insensitive to variations in antenna height, use of higher elevation antennas could decrease the effective exclusion zone, because much of the exclusion zone associated with the transmitter may be in the air above roof level. Indeed, a terrestrial licensee may be able to operate with an exclusion zone that covers a few DBS subscribers by developing individualized accommodations, as UHF TV broadcasters currently do to mitigate intermodulation problems close to their transmitters.

¹⁶ Obviously, depending upon the environmental conditions of the local area, a network of monitoring stations may be required. Because existing DBS end-user antennas can be easily modified to serve as received signal level monitors, the costs of local monitoring are relatively low.

While Northpoint continues to test with its experimental license,¹⁷ the feasibility of its technology has been demonstrated. Since the system can be used to transmit terrestrially in the DBS band without causing interference to DBS subscribers, locally transmitted signals can be integrated into existing DBS subscriber equipment, with only minor modifications, so that local television stations, rather than distant signals, can be viewed. Moreover, the Northpoint system can utilize the same modulation techniques as existing DBS transmissions. In this manner, the subscriber antenna (which can, in cases, be a simple, inexpensive mylar device), can be connected directly to the subscriber's DBS receiver unit. Thus, using Northpoint local signal distribution technology would preserve the estimated \$3 billion dollar equipment investment by the 8 million American DBS subscribers and allow a minimal marginal cost for adding local signals. Implementing this system can thus solve several problems for the DBS operators and eliminates their biggest barrier to being truly competitive to cable television. Northpoint's solution is the only potential local signal distribution mechanism that at once operates in the same band and holds the promise of carrying all local broadcast signals.

As a final matter, Northpoint observes that, at WRC-97, non-geostationary fixed satellite service ("non-GSO FSS") use of certain bands, including the 12.2-12.7 GHz band, was permitted subject to two sets of provisional power flux density ("pfd") limits intended to protect existing terrestrial and geostationary broadcast satellite service ("GSO-BSS") operations. Obviously, because the United States has deployed both terrestrial and DBS systems in the 12.2-12.7 GHz

¹⁷ Northpoint has applied for a modification to its experimental license to permit it to engage in further testing in the Austin, Texas market, hopefully in conjunction with one or more DBS licensees. These tests, among other things, will consider the effects of urban environments, multipath, and optimization of the terrestrial transmitter placement.

band, any non-GSO satellite system would be limited by the more stringent of the provisional pfd limits adopted at WRC-97. Specifically, under the provisional pfd limits adopted at WRC-97, the equivalent (combined) pfd for a non-GSO FSS system may not exceed, for an antenna diameter of 45 cm, -174.3 dB(W/m²/4 kHz) 99.7 percent of the time and in no case more than -165.3 dB(W/m²/4 kHz). These limits are, however, provisional and the resolution adopted at WRC-97 was intended "to ensure that the interference caused by [non-GSO] systems . . . is maintained within *negligible* levels."¹⁸ At these pfd levels, Northpoint believes non-GSO systems would interfere with deployment of its technology. Indeed, some dispute has even arisen with respect to whether these limits would even protect conventional DBS operations. Northpoint therefore urges the Commission to consider carefully the respective benefits to domestic consumers of its technology versus allowing non-GSO systems in the 12.2-12.7 GHz band at these provisional pfd limits.

B. Deployment of Northpoint's Technology Will Not Cause Harmful Interference To Incumbent Microwave Operations

Prior to the establishment of an allocation by the Commission in the 12.2 - 12.7 GHz band for DBS in 1983, limited fixed microwave services were authorized in this band. These operators were required to relocate from the 12.2 - 12.7 GHz band or be relegated to secondary, non-interference status with respect to DBS operations. Several hundred of these licensees continue to operate fixed terrestrial microwave stations throughout the United States.

¹⁸ Res. COM5-19 (WRC-97) (emphasis added).

Because these stations are fixed in nature, higher in power, and similar in configuration to the proposed Northpoint technology, interference from Northpoint terrestrial stations is unlikely to occur. Moreover, the vast majority of incumbent terrestrial operations are located in rural areas. Rural areas have fewer local channels that must be carried via Northpoint terrestrial stations and therefore require fewer Northpoint terrestrial stations overall than urban areas, minimizing the possibilities for conflicts or incompatibilities. Finally, in areas where a possibility of interference may arise between Northpoint and incumbent operations, interference concerns may easily be allayed through the use of better receive or transmit antennas, adjusting of power, eliminating transmissions in affected frequencies,¹⁹ or a combination of these techniques.

C. Northpoint's Technology Can Provide a Commercially Reasonable Reliable Service Area Even In the Presence of Existing Uses of the 12.2-12.7 GHz Band

Northpoint technology would be susceptible to interference from DBS operations in much the same fashion as the incumbent microwave systems. Due to precise engineering of its technology, Northpoint has shown by its experimental testing that it can maintain its relatively low power system with a reliable service area of 10 miles (16 km) without receiving signal degradation from a DBS transmission.²⁰ Similarly, with respect to the incumbent microwave

¹⁹ Pursuant to Section 101.109, the maximum authorized bandwidth for operational fixed systems in the 12.2-12.7 GHz band is 20 MHz. Thus, one potential means for eliminating interference without significantly altering the capacity of the Northpoint system is for the system to simply not transmit on frequencies overlapping with OFS usage in a particular area.

²⁰ Because Northpoint's testing utilized a very low transmit antenna height (52 feet AGL), the 10-mile service area is very conservative. In fact, Northpoint's estimate of a 10-mile service area
(Continued...)

systems, Northpoint will be able to engineer its systems so that subscribers do not suffer harmful interference from other terrestrial sources. Because the point-to-point systems operate on only a small portion (20 MHz or less) of the 500 MHz within the band, local systems can be engineered to eliminate interference on that portion of the band. These factors can also be improved through the use of better receive or transmit antennas, dynamic power control, or combinations of these changes.

V. THE COMMISSION SHOULD EXPEDITIOUSLY MODIFY ITS RULES TO ALLOW FOR SUBSIDIARY TERRESTRIAL USE OF THE DBS BAND

Significantly, only minimal rule modifications are necessary for the introduction of Northpoint's proposed terrestrial/DBS sharing in the 12.2-12.7 GHz band. Indeed, the many benefits of Northpoint's technology can be realized simply by modifying existing Section 101.147(p) of the Commission's Rules.²¹ At present, this provision states that fixed microwave licensees may be licensed in the 12.2-12.7 GHz band, but only so long as they do not cause interference to operating DBS systems. Under Northpoint's proposal, detailed in Attachment A, the content of the existing subsection (p) would be preserved in its entirety and a new subsection (p)(1) would be added to govern the similar, non-interference use of the band by terrestrial DBS.

Consistent with other cases where subsidiary communications authorizations are issued and with the overriding need to protect DBS subscribers, Northpoint's revisions provide for secondary licensing for terrestrial DBS. Further, in order to facilitate arrangements whereby

(...Continued)
includes approximately 19 dB of ground attenuation.

²¹ 47 C.F.R. § 101.147(p).

DBS providers could engage in equity sharing arrangements with local broadcasters or other entities willing to construct facilities for terrestrial DBS signal carriage, Northpoint proposes that both DBS licensees and their affiliates be eligible for terrestrial DBS authorizations. This would allow cooperative arrangements in local areas by some, or all, of the DBS providers. For similar technical reasons, the proposed rule modification also requires coordination with all DBS licensees.

Northpoint notes that Part 101 also contains a number of other technical standards for operations in the 12.2-12.7 GHz band that are inapplicable for a terrestrial DBS offering. Accordingly, Section 101.147(p)(1) exempts such operations from Sections 101.103 (frequency coordination), 101.105 (interference protection criteria), 101.107 (frequency tolerance), 101.109 (emission bandwidth), 101.111 (emission limitations), and 101.115 (directional antennas).

Northpoint's proposed rules also subject subsidiary licensees to "must carry" obligations and retransmission consent by classifying such licensees as cable television operators for purposes of Section 76.56 of the Commission's rules. Thus, terrestrial DBS licensees would be required to carry the signals of any local broadcaster, but the broadcaster could elect retransmission consent and require the licensee to negotiate for the right to carry its local signal. Under the 1996 modifications to the compulsory copyright law, such regulations are feasible because a terrestrial DBS adjunct would fit within the definition of a "cable television system" for purposes of compulsory copyright.

VI. CONCLUSION

Northpoint urges the Commission to act rapidly to issue a notice of proposed rulemaking providing for terrestrial, shared use of the DBS band. As fully described above, Northpoint's

technology will further a number of important FCC and Congressional goals. Most significantly, by providing an efficient and effective solution to the DBS local television signal distribution problem, Northpoint's proposal would remove a major barrier to full and fair competition in the multichannel video program distribution marketplace, with resulting benefits to consumers. The system would also promote localism and address community needs, enable DBS providers to meet Congressionally-mandated, noncommercial programming requirements, permit the offering of a wide range of broadband data services, and provide a model for spectrum sharing in other frequency bands. Moreover, bringing all Americans the benefits of Northpoint's technology can be accomplished quickly and with only minor alterations to the Commission's rules. Northpoint accordingly urges the Commission, consistent with the policies discussed herein, promptly to issue the requested rulemaking proposal.

Respectfully submitted,

NORTHPOINT TECHNOLOGY

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Dated: March 6, 1998

ATTACHMENT A

A. Part 101 of Chapter 1 of Title 47 of the Code of Federal Regulations is amended as follows:

PART 101 - FIXED MICROWAVE SERVICES

1. The authority citation for Part 101 continues to read as follows:

Authority: Sec. 4 and 303 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 524 and 303, unless otherwise noted.

2. Section 101.147(p) is revised to read as follows:

§ 101.147 Frequency assignments.

* * * * *

(p) *12,000 to 12,700 MHz*: The Commission has allocated the 12,200 to 12,700 MHz band for use by the broadcasting-satellite service. Terrestrial use is authorized under the following circumstances:

(1) Broadcasting-satellite service licensees and their affiliates may utilize the 12,200 to 12,700 MHz band terrestrially on a secondary, shared, non-interference basis to transmit video entertainment material, data and other communications traffic related to the operation of the broadcasting-satellite system. Such applications must be fully coordinated with all possibly affected broadcasting-satellite service licensees prior to operation and are not governed by Sections 101.103, 101.105, 101.107, 101.109, 101.111, and 101.115 that cover the fixed microwave service. As a condition of authorization under this subsection, terrestrial licensees will be required to assume the obligation of cable television companies to carry local commercial television stations set forth in Section 76.56 of the Commission's Rules.

(2) Private operational fixed point-to-point microwave stations authorized after September 9, 1983, will be licensed on a non-interference basis and are required to make any and all adjustments necessary to prevent interference to operating domestic broadcasting-satellite systems. Notwithstanding any other provisions, no private operational fixed point-to-point microwave stations are permitted to cause interference to broadcasting-satellite stations of other countries operating in accordance with the Region 2 plan for the broadcasting-satellite service established at the 1983 WARC.

* * * * *

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Dated: May 5, 1998

SUMMARY

Northpoint's *Petition* seeks minor rule modifications that would enable DBS providers and their affiliates to offer the full range of local television stations, as well as data services, finally leveling the playing field for DBS providers to compete with cable operators. By solving the local signal problem, Northpoint's patented system will jumpstart competition in the multichannel video program distribution market, resulting in lower rates and increased program variety for consumers nationwide. Northpoint has estimated that the economic benefits of its system could save consumers over \$3 billion annually. Moreover, providing DBS customers with local television programming and data offerings would promote valuable Congressional and Commission policies directed to advancing localism and public service.

The fundamental premise of the Northpoint system is to complement existing DBS programming. Thus, Northpoint shares the concern of DBS providers that its technology avoid any harmful interference to DBS subscribers. Accordingly, attached hereto is a Technical Annex that provides a link budget and interference analysis for a typical Northpoint terrestrial facility, including its impact on all DBS systems. The Technical Annex clarifies a number of misunderstandings regarding sharing between Northpoint and satellite-originated programming, most notably the level of protection to be afforded to DBS signals. While Northpoint determined in its first experimental test that the operational Carrier-to-Interference threshold is 4.8 dB, Northpoint's typical system would, in fact, naturally provide 20 dB -- the level identified as necessary by a number of DBS licensees.

The Technical Annex also demonstrates that Northpoint terrestrial transmitters and DBS signals can co-exist without harmful interference. Without even employing site-specific

engineering, the natural operation of the Northpoint system automatically provides 20 dB of C I protection to DBS in 99.5 percent of the geographic service area of the transmitter. The remaining 0.5 percent of the service area (which would be engineered to cover far less than 0.5 percent of the population), can be further reduced by increasing tower height and beam tilt or eliminated through site specific engineering techniques. Moreover, a number of additional methods can be used by terrestrial licensees—at their own expense—to eliminate interference to the very few subscribers still potentially affected by the Northpoint system.

Northpoint's reply also addresses the opposition of SkyBridge, which is founded upon incorrect interpretations of both domestic and international law. Under domestic law, Northpoint has sought a status secondary to DBS and existing fixed services in the band. However, under international law, regardless of whether Northpoint's system is classified as a broadcast service or a fixed service, it is co-primary with nongeostationary fixed satellite services, such as the SkyBridge system. Northpoint is participating in international study groups to develop reasonable sharing criteria for the 12.2-12.7 GHz band, consistent with ITU allocation policies. Because SkyBridge has represented in its application that it will not impose any operational constraints on satellite or terrestrial operators, its position now that Northpoint will almost certainly interfere with its system is especially troubling.

As documented herein, Northpoint's system will not interfere with existing or future DBS subscribers. Moreover, to the extent any limited technical issues remain, these can be fully addressed in the context of the further experimental testing proposed by Northpoint in Austin, Texas. Given the vast public interest benefits promised by Northpoint's technology, the Commission should take all necessary action to expedite the rule making requested herein.

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)	
)	
NORTHPOINT TECHNOLOGY)	RM No. 9245
)	
Petition for Rule Making To Modify Section)	
101.147(p) of the Commission's Rules To)	
Authorize Subsidiary Terrestrial Use of the)	
12.2-12.7 GHz Band By Direct Broadcast)	
Satellite Licensees and Their Affiliates)	

REPLY COMMENTS OF NORTHPOINT TECHNOLOGY

Northpoint Technology ("Northpoint"), by its attorneys, hereby replies to the comments on its Petition for Rule Making.¹ The *Petition* introduced a new sharing technology that promises to allow Direct Broadcast Satellite ("DBS") providers to compete fully with cable television services by offering DBS customers a full line up of local television broadcast signals and other data services. Because Northpoint has sought to work in partnership with DBS licensees, Northpoint shares their desire to ensure the integrity of DBS offerings. This reply, accordingly, includes a Technical Annex that clarifies the proposed operation of its technology, resolving all legitimate interference concerns.² The technical analysis can be further validated by Northpoint's proposed Austin, Texas test of its technology, for which an experimental

¹ Northpoint Petition for Rule Making To Modify Section 101.147(p) of the Commission's Rules To Authorize Subsidiary Terrestrial Use of the 12.2-12.7 GHz Band By Digital Broadcast Satellite Licensees and Their Affiliates, RM 9265 (filed Mar. 6, 1998) ("*Petition*"). See FCC Public Notice, Report No. 2265 (Mar. 19, 1998).

² See Attachment A ("Technical Annex").

application is pending. Given the significant public interest benefits to result from deployment of the Northpoint system, the Commission should move forward expeditiously to initiate the rule making requested herein.

I. NORTHPOINT TECHNOLOGY WILL COMPLEMENT THE DBS SERVICE, SOLVING THE MOST VEXING COMPETITIVE PROBLEM IN THE MULTICHANNEL VIDEO PROGRAM DISTRIBUTION MARKET

As explained in the *Petition*, Northpoint's patented technology was developed finally to enable DBS to compete fully with cable television. By providing a means for DBS providers to offer the full panoply of local television signals as well as data services, Northpoint's technology removes the biggest impediment to competition in the multichannel video program distribution marketplace. Northpoint has estimated conservatively that the benefits of its system could save American consumers over \$3 billion annually. Its technology is also the only local signal distribution system for DBS that preserves the substantial investment in consumer equipment made by the 8 million current U.S. subscribers to DBS service.

The Northpoint system achieves its public interest benefits in partnership with DBS providers. Because Northpoint views its technology as adding value to—and not replacing—core DBS offerings, the fundamental premise of Northpoint's technology is to avoid any adverse impact on DBS reception by subscribers. Accordingly, Northpoint takes very seriously *any* threat of harmful interference and is committed to working with each and every DBS licensee to resolve all legitimate technical concerns regarding co-existence of satellite and terrestrial signals. Northpoint has, accordingly, attached a comprehensive Technical Annex to these comments that fully answers the questions raised in the filings on the *Petition*.

II. NORTHPOINT TECHNOLOGY IS ENGINEERED TO ELIMINATE THE POTENTIAL FOR ANY ADVERSE IMPACT ON CONSUMER DBS RECEPTION

Northpoint's patented technology is designed to: (i) provide a commercially reasonable reliable service area; while (ii) minimizing interference to co-frequency DBS systems.

Northpoint will achieve these goals by deploying a terrestrial transmission infrastructure engineered to take advantage of site specific engineering and other considerations that minimize any necessary signal "mitigation" area.³ Attached to this reply is a Technical Annex providing Northpoint's proposed link budgets and interference analysis consistent with the 20 dB Carrier-to-Interference ("C/I") ratio advocated by DBS operators as necessary to protect their operations. As demonstrated therein, even without the use of site specific engineering, a typical Northpoint system will naturally achieve a C/I ratio of 20 dB or more in 99.5 percent of the reliable service area. Moreover, within the mitigation zone (comprising 0.5 percent or less of the coverage area), Northpoint's technology employs a variety of engineering techniques to ensure that DBS consumers are not adversely impacted by these terrestrial operations.

A. Northpoint Technology Can Be Deployed With a Commercially Reasonable Reliable Service Area and a Minimal Mitigation Zone

Because Northpoint is seeking to work cooperatively with DBS licensees, its proposed rules provided considerable flexibility to engineer solutions for DBS/terrestrial sharing taking

³ Due to confusion apparently generated by Northpoint's use of "exclusion zone," Northpoint's filings utilize the term "mitigation zone" to describe the area where the terrestrial transmitter theoretically could afford less than 20 dB C/I protection to DBS receivers, but where the Northpoint technology and other engineering techniques can be used to mitigate and avoid harmful interference.

into account site specific engineering and propagation considerations. Northpoint sought to define in cooperation with DBS providers, and enumerate through the rulemaking process, a series of principles and operating values from which specifics could be developed. Thus, while a link budget can be prepared for a typical locale, different areas may warrant deployment of a system with higher or lower power, greater or lesser antenna height, beam tilt, or other modifications of transmission characteristics as prescribed by Northpoint's system.⁴ Northpoint continues to believe it is necessary to provide significant flexibility within the proposed Section 101.147 to accommodate the unique characteristics of particular areas.

Northpoint never intended such regulatory flexibility to create confusion about the interference mitigation characteristics of its deployed system. Northpoint has always intended to operate its technology in a fashion designed to protect DBS receivers with an acceptable C/I ratio. While Northpoint documented a 4.8 dB C/I as a threshold in its first experimental test, this was not intended to imply that only this level of protection would be afforded to DBS operations under real world conditions.⁵ Instead, and in agreement with the comments of Tempo and Echostar,⁶ Northpoint believes that 19-20 dB is a good initial target ratio for isolation between

⁴ For example, the Northpoint transmitter (and its mitigation zone) could be located on an antenna farm where no customer DBS dishes are deployed. In other areas, due to the lack of antenna towers or other facilities, engineering a Northpoint system may require a network of lower power transmitters with mitigation zones significantly less than derived in the Texas tests.

⁵ The statement of a 4.8 dB C/I ratio was not intended to cause controversy, but rather to be understood as an empirically derived threshold value above which frequency sharing becomes possible. Clearly, reliable co-channel systems would be designed to operate with a much greater operating margin.

⁶ Tempo Comments at ¶5; Echostar Comments at 9. Notably, DirecTV has asserted the need for an approximate 35 dB C/I ratio, based on ITU Appendix 30. However, Northpoint believes that 20 dB is a much more realistic criteria, given the conservative nature of the Appendix 30

(Continued...)

Northpoint and DBS signals.⁷ Given the robust nature of digital signals, however, it may be possible to improve upon this figure in cooperation with DBS providers.

Northpoint's design easily can meet this 20 dB target. Even in the preliminary King Ranch tests, 97 percent of the reliable service area had 20 dB or greater isolation between the DBS systems.⁸ The Technical Annex demonstrates that a typical Northpoint system will naturally provide 20 dB or greater protection automatically to 99.5 percent of the terrestrial reliable service area, even without the use of additional localized engineering techniques. Indeed, this value considers only free space propagation effects, the directional isolation of consumer DBS dishes (based on DBS-provided antenna patterns), vertical isolation of the Northpoint transmitter, and a very conservative estimate of line-of-sight blockage.⁹ Clearly, if either the C/I of 20 dB is excessive or the line-of-sight blockage is greater in practice, the

(...Continued)

calculations and the assumption of analog-to-analog signal interaction, rather than digital-to-digital signal interaction.

⁷ A 19-20 dB C/I ratio provides a significant amount of isolation. It essentially requires that the DBS signal is 100 times stronger than the terrestrial signal.

⁸ Importantly, the King Ranch tests did not employ any of the interference mitigation techniques available to Northpoint (*e.g.*, higher tower, beam tilt, *etc.*).

⁹ As explained in the appendix, a significant number of DBS antenna installations will not have line-of-sight to a Northpoint transmitter given the manner in which the antenna is mounted. For example, a DBS antenna mounted on the side of a house with southern exposure will be blocked by the house from line-of-sight to a Northpoint transmitter. While Northpoint estimates only 50 percent blockage, the actual effect of line-of-sight blockage is likely to be significantly higher. Indeed, RCA's dish installation instructions indicate roof mounts, which are more likely to have line-of-sight to a Northpoint transmitter, are only a "last resort" and Sony's installation instructions state "[m]ounting on the roof is also not recommended." See <http://www.sel.sony.com/SEL/consumer/dss/page8.htm#place>.

percentage of customers in the mitigation zone could be reduced to significantly less than 0.1 percent.

As noted above, the basic analysis in arriving at the 99.5 percent figure does not take into account additional available and practical engineering techniques based on local factors.

Importantly, such techniques, which are an integral part of Northpoint's technology, could further reduce the mitigation zone:

- ***Increase in Tower Height.*** Northpoint's engineering calculations assume a variety of tower heights. To the extent higher transmitter tower facilities are available, there will be a significant reduction of the isotropic received signal strength ("RSSI") providing additional protection to DBS receivers and further limiting the size of the mitigation zone. The additional protection afforded by the use of higher antenna heights is demonstrated in the engineering exhibit, which shows reductions in the percentage of the coverage area in the mitigation zone.
- ***Attenuation in the Vertical Plane.*** Northpoint's engineering calculations utilize an antenna with a half-power single sided beamwidth of 9°, reflecting the off-the-shelf antenna used in the King Ranch tests. When needed, Northpoint's technology contemplates employing an antenna with further vertical plane attenuation to reduce signal power within the mitigation zone while having minimal impact on the service area. This would provide required protection to DBS signals. Using these techniques of the Northpoint system, the mitigation zone conservatively can be completely eliminated in many metropolitan areas.
- ***Additional "Clear Sky" Margin.*** The rather low percentage of customers in the mitigation zone can be further reduced in many areas of the country where the 11.4 dB clear sky Carrier-to-Noise figure budgeted by DBS providers is excessive. Where an additional 3 dB of clear sky margin is available, the percentage of customers in the mitigation zone would be reduced to only slightly over 0.1 percent, independent of any other mitigation techniques described above.

Northpoint's technology contemplates that these techniques can and will be used in conjunction to limit—or even eliminate¹⁰—the mitigation zone for specific deployment scenarios. And, as

¹⁰ Indeed, in many major metropolitan areas, such as New York, Phoenix, San Francisco, and Los Angeles, local conditions allow placement of Northpoint transmitters at heights greater than 200 m. At these antenna elevations, there is sufficient attenuation through vertical plane

(Continued...)

discussed below, there are a variety of techniques within the nominal mitigation zone to eliminate interference to specific DBS antennas. These factors demonstrate that deployment of Northpoint systems is commercially and economically feasible without interference to DBS systems.¹¹

B. Northpoint Systems Can Employ a Variety of Engineering Solutions Within the Mitigation Zone To Ensure Interference-Free Reception of DBS Transmissions

As discussed above and in the Technical Annex, Northpoint's system can be deployed on an interference-free basis in the vast majority of the terrestrial transmitters' service area. While each service area could have a mitigation zone where sharing becomes an issue, this zone will be a very, very small percentage of the overall service area—0.5 percent or less. Moreover, through judicious site selection, the percentage of the population within the mitigation zone can be reduced well below 0.5 percent. Finally, as discussed below, even within the mitigation zone, Northpoint's technology contemplates the use of a variety of techniques to ensure that terrestrial transmitters do not interfere with DBS reception.

(...Continued)

discrimination, beam tilting, and path loss to maintain a constant RSSi below critical levels throughout the entire service area—allowing complete DBS/Northpoint sharing without any mitigation zone.

¹¹ Clearly, the assumptions made in some comments regarding the link budget, availability, and commercial feasibility of Northpoint's system are not accurate. Northpoint's system, for example, is engineered to 99.7 percent reliability in ITU rain region E with a rain margin of only 1.6 dB, rather than the 12.8 dB assumed by one commenter. Moreover, because 75.2 percent of the U.S. population lives within Census-defined urbanized areas that constitute only 2.5 percent of the U.S. land area, Northpoint could nominally cover three quarters of the U.S. population with less than 800 transmitters comparable to the system described in the exhibit. In comparison, there are over 1,000,000 cellular base stations in operation.

As an initial matter, Northpoint systems will not be deployed in an arbitrary manner, but strategically with interference minimization in mind. In many cases, interference-free operation can be guaranteed through the use of property rights. For example, where the affected area is owned by the terrestrial licensee or the tower owner, it can be assured that no DBS receivers will be present in the mitigation zone. Where this is not possible, siting areas can still easily be identified in which the population density is far lower than the average throughout the service area. Thus, even in a scenario where the mitigation zone may comprise 0.5 percent of the land area, the percentage of the service area population within the mitigation zone can be designed to be far, far less than 0.5 percent of the served inhabitants.

Even if the mitigation zone encompasses areas where some DBS installations are or could be present, Northpoint anticipates that terrestrial licensees—at their own expense—would eliminate interference for those few individual installations using a variety of techniques. In some cases, poorly pointed DBS dishes may simply require repointing or minimal relocation (for example, from the top of the roof to the side of the house). In other cases, an antenna upgrade to a flat plate antenna could be used to provide additional protection to the DBS subscriber. In more extreme cases, RF shielding could also be employed. Thus, there is an array of individualized solutions that can be implemented by local licensees, at their expense, to rectify any of the very few situations where a DBS subscriber's reception could potentially be adversely affected by a Northpoint system.

Northpoint's technology thus assures complete protection for DBS subscribers. Through the various engineering methods embodied in Northpoint's technology, well over 99.5 percent of DBS subscribers automatically will receive interference protection of 20 dB or greater. For the remaining (at most) 0.5 percent of DBS subscribers within the mitigation zone, a variety of

techniques exist to ensure the integrity of the DBS signal. Thus, Northpoint's terrestrial re-use of the 12.2-12.7 GHz band poses no legitimate threat of adverse effect to DBS licensees.

C. The Comments Strongly Underscore the Benefits of Northpoint's Proposed Further Experimental Testing

To the extent that any interference concerns remain, Northpoint believes that they can be allayed by its further system tests proposed for Austin, Texas. Northpoint urges all of the DBS licensees to observe, or even participate in, this second phase of its experimental testing. Obviously, given the time and location constraints imposed on its original experimental authorization, Northpoint's testing was not, and could not have been, all-inclusive. The King Ranch tests, however, did successfully demonstrate the validity of the sharing technique and the promise of Northpoint's technology. Northpoint, obviously, is interested in additional experimental progress precisely to provide further real world validation of its technology and to directly address many of the issues raised by commenters. The record herein thus supports prompt action on Northpoint's pending request for a modified experimental license.

Some commenters, for example, indicate their concern about multipath interference. This is a particular area Northpoint wants to explore through further testing. Multipath occurs only when a signal is reflected off of some other structure and thus indirectly received by a DBS dish. As a practical matter, however, DBS dishes are highly directional, with 32 dB or greater rejection outside of a 20° cone. Because the angle of incidence equals the angle of reflection, for a reflected Northpoint signal to fall within this 20° cone, geometry dictates that the DBS dish would generally be blocked or shielded from the DBS satellite. In any case, given the directivity of the DBS antenna, the dish could potentially be relocated to eliminate potential multipathing. Outside the 20° cone, given the 32 dB attenuation of the antenna and the absorption that occurs

when radio signals reflect,¹² no practical effect on the system is at all likely. Nonetheless, one of the principal reasons that Northpoint seeks to test in Austin is to evaluate fully the effects of multipath created by an urbanized environment.

Thus, while Northpoint takes very seriously any legitimate threat of harmful interference to core DBS offerings, the basic principles of DBS/terrestrial sharing are sound and have been empirically verified. While engineering questions may still exist, these limited questions can be addressed, fully and finally, through Northpoint's proposed further experimental testing.¹³ The Commission, accordingly, should move expeditiously to grant Northpoint's requested experimental modification application.

III. NORTHPOINT'S SYSTEM IS CO-PRIMARY WITH PROPOSED NGSO FSS USE OF THE 12.2-12.7 GHz BAND

SkyBridge, a proponent of an NGSO FSS system in the 12.2-12.7 GHz band (among other bands), opposes the *Petition*. SkyBridge raises two concerns: (i) that Northpoint may interfere with DBS and, (ii) that Northpoint may interfere with proposed NGSO systems. Given the serious technical concerns about the ability of SkyBridge or any NGSO to share spectrum with DBS operations, it is ironic, to say the least, to observe SkyBridge championing interference-free operations of DBS systems in the band. The Commission need not concern itself with SkyBridge's attenuated concern, however ephemeral, for DBS operations.

¹² While the absorption varies depending upon the surface reflecting the signal, the types of materials found in residential areas where the majority of DBS dishes are located (e.g., wood, brick) generally have high absorption factors.

¹³ Certainly, further testing should not be opposed on the Catch-22 grounds that the parameters Northpoint seeks to test have not already been tested.

SkyBridge's second argument is equally flawed. Showing its true intentions, SkyBridge reverses a prior position that it would not impose technical or operational constraints on co-frequency operations and other claims for interference-free sharing throughout the Ku band. Instead, SkyBridge now asserts that Northpoint "almost certainly" will cause interference to proposed NGSO FSS operations. As a result, SkyBridge requests that Northpoint's proposed terrestrial fixed service (FS) and terrestrial broadcast service (BS) operations be made secondary to NGSO FSS. SkyBridge's arguments are misplaced for three distinct reasons.

First, SkyBridge's claim of interference is unsupported by any analysis or evidence whatsoever. It is noteworthy that although SkyBridge critiques Northpoint's technical showing, its filing merely asserts – without proof – that it will receive harmful interference from Northpoint. Moreover, the sparse technical data provided merely demonstrates SkyBridge's utter lack of understanding of even the fundamental technical characteristics of Northpoint's technology.¹⁴ SkyBridge's apparent lack of familiarity with antenna receive characteristics seriously calls into question its ability to develop and operate, on an interference-free basis, the complicated satellite system it proposes.

Second, SkyBridge misrepresents the relevant international spectrum allocations. The international spectrum table for the 12.2-12.7 GHz band contains primary allocations for both fixed and broadcasting services, as well as for the broadcasting-satellite service. Northpoint's

¹⁴ For example, on page 15 of its comments, SkyBridge questions Northpoint's engineering on the ground that Northpoint's experimental results yielded differing results for DirecTV and EchoStar. However, the interference characteristics of each system stem from the system azimuths viewed from any terrestrial receiver, which vary from system to system. Northpoint expected such variances, and specifically designed its system to protect the most sensitive DBS receiver.

proposed offerings will include both fixed and broadcasting service but, however classified, its operations are co-primary in the band. Northpoint's fixed and broadcast services also are co-primary with NGSO FSS in Region 2, as a result of the S5.487A footnote added at WRC-97. Thus, under the ITU treaty, any NGSO use of 12.2-12.7 GHz, including by SkyBridge, would be co-primary with terrestrial FS and BS operations such as that planned by Northpoint.

To ensure continued interference free operations, Northpoint has now become active in the U.S. Joint Technical Group 4-9-11, which is examining the WRC-97 provisional power flux density (pfd) limits placed on NGSO operations in the band. The goal of Northpoint, and of this group, is to seek means for harmonious co-existence of systems in the 12.2-12.7 GHz and other bands. Northpoint is now in the process of evaluating provisional pfd limits to ensure co-existence of fixed and broadcast systems with NGSO FSS. However, in any event, Northpoint's system is co-primary with NGSO FSS operations under international law.

Third, SkyBridge asserted domestic policy that might make Northpoint's system secondary to NGSO operations in the U.S. is wholly imagined. Northpoint's FCC *Petition* seeks an allocation secondary only to BSS operations in the band, as required by international footnote S5.490.¹⁵ Contrary to the assertions of SkyBridge, this does not imply that Northpoint's system would be secondary to NGSO FSS as well. SkyBridge provides no basis under FCC regulation or policy to support any different conclusion.

Indeed, as a matter of domestic policy, SkyBridge's comments in this proceeding are the best evidence yet that its proposed system is flying under the false colors of supposed

¹⁵ Northpoint also proposes to protect pre-existing point-to-point Fixed Service licensees in the band.

interference-free operation. SkyBridge represents in its application that it “will impose no operational constraints on satellite and terrestrial operators.”¹⁶ Under the circumstances, SkyBridge has no basis for commenting in this proceeding, much less claiming complete interference protection from Northpoint or any other fixed or broadcasting service in the band. Alternatively, if SkyBridge cannot really share the spectrum with other co-primary services, it should be required to file a major amendment to its application noting with specificity the operational constraints that it seeks to impose on terrestrial operators.

IV. CONCLUSION

As documented in the attached Technical Annex, Northpoint transmitters can co-exist on an interference-free basis with DBS systems. In over 99.5 percent of the reliable service area of such transmitters, protection of 20 dB or more – the sufficient level of protection identified by the DBS licensees themselves – occurs automatically. The use of Northpoint technology’s additional specialized, yet eminently practical, engineering techniques can reduce any remaining mitigation zone even further. Finally, for those rare cases where the potential for a received signal strength offering less than 20 dB protection is possible, an array of interference prevention solutions is available – at terrestrial licensees’ expense – to eliminate completely harmful interference to DBS customers.

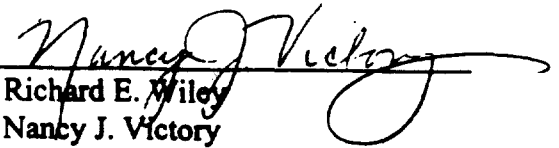
The initial testing of Northpoint’s technology has already proven the legitimacy of its core sharing technique. The additional real world tests contemplated in its pending experimental modification application will serve to allay any remaining interference concerns. Accordingly,

¹⁶ SkyBridge L.L.C. Application, 89-SAT-AMEND-97 at 22.

given the substantial public interest benefits likely to result from Northpoint's system—the only available means for enabling DBS providers to compete fully with cable television services—the Commission should promptly initiate a rule making to facilitate the deployment of this valuable technology to the American public.

Respectfully submitted,

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